

The Ballarat Naturalist

February 2018



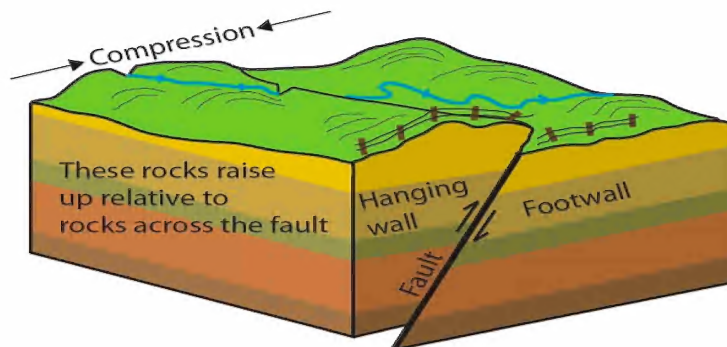
Earthquakes and Volcanoes

Speaker: Gary Gibson, Uni. of Melb. & Seismology Research Centre

Gary is involved with earthquake hazard consulting, providing advice about potential earth movements to businesses such as mining companies. He has completed over 300 studies in Australia, south-east Asia and the Pacific region.

A map of the world showed us the basic distribution of earthquakes i.e. along the boundaries of the tectonic plates. An earthquake was defined as the motion produced when stress builds up over a long period of time until the rocks break. For an earthquake we see a permanent change in the topography of the earth's surface, including the ocean floor – displacement along a fault, and we feel the vibrations. Seismographs record different types of vibrations which arrive at the station at different times, thus enabling scientists to work out the depth of the earthquake and its distance from the point of measurement, and to assign a magnitude to the observed strength of the quake. The logarithmic Richter scale is used, where 9 would be catastrophic, and 2 is felt only by the seismographs. A magnitude 4 would affect 1km^2 , be 1km long and last for 3 seconds.

Gary used the example of the 1986 quake along the Marryat Fault in SA which registered 5.7, with a vertical displacement of 60cm along 12 km.



Block diagram of reverse fault

Four important notices about 2017-18 Syllabus events

- . **Feb 4 2018 Excursion to Western Treatment Plant** Depart 8.30am Arrangements for transport to Werribee were made at the Dec. meeting but **two seats are still available** (Contact: J Gregurke.)
- . **Feb 4 2018** Fran Hanrahan's excursion has been postponed until a later date.
- . **Mar 24** Exc. combined with FNCV Marine Research Group for study of Ecology of Littoral Zone, Danger Pt., Torquay
- . **Erratum** in Syllabus: March AGM 2018 is on Fri. **2** March

Almost all faults in Australia are reverse faults which produce an overhanging scarp. When weathered, the fault line is not always seen at the surface.

Reverse faults indicate that the earth's crust has been compressed, as distinct from being stretched (normal fault) or moved horizontally (strike-slip fault). Gary also mentioned the Cadell Fault near Deniliquin which had a 15m scarp; it is likely that a magnitude 7 quake would have occurred. The 2010 quake in Chile which was along a plate boundary measured 8.8, occurred along a fault hundreds of kilometres long, had a 15m vertical displacement, created a tsunami, and caused 450 deaths.

A map of Australian quakes greater than magnitude 4 since 1900 showed a pattern concentrated along the eastern mountain ranges and the Flinders Ranges, with many also occurring offshore. Between 1850 and 2004, the most powerful quake occurring on the Australian continent, including the continental shelf, was offshore near Carnarvon in 1906, with a magnitude of 7.6.

Prior to 1959 there were few seismographs in Victoria, and quakes were mapped only where they were felt and hence where the population was distributed. A Mag. 7 quake at Beachport was felt in Melbourne in 1883, and in 1946 one occurred east of Flinders Is. From 1960 many more seismographs were put in place thanks to the impetus provided by the 1957-58 International Geophysical Year. Many quakes seemed to occur in eastern Victoria where seismographs were plentiful (!) and the Latrobe Valley is still relatively active. From 1976-2000 farmers were encouraged to install seismometers near their dams due to the influence of the weight of water.

Gary then showed us a map of Victoria's Western District Volcanic

Plains, where volcanoes have erupted over the last five million years. There is a large number north and west of Melbourne, and a string of them along an east-west axis from Geelong to SA. The last 100,000 years have seen the most volcanic activity. He then superimposed a map showing the distribution of earthquakes over the same area, and there was almost no correlation, because the area is not on the boundary of a tectonic plate.

Gary's enthusiasm for his subject was evident as he described the lead-up to the eruption of the Rabaul volcano which occurs at the edge of a plate and has its difficulty of precise forecasting.

There were no quakes in Australia for 18 years until last May when one occurred in the Petermann Ranges in the SW of the Northern Territory. It was recorded near Giles Weather Station, where ANU installed more seismographs. The rupture was difficult to find on the ground due to the compression and only a series of bangs and a scattering of rock chips gave clues as to its location. Measurements of quake depth revealed a new fault at a sharp angle to the known Petermann fault. In situations like this in remote areas the use of drones and helicopters, and before-and-after photographs can assist the research.

Gary's enthusiasm prompted a number of questions and interest in the seismograph record which he was able to access as a live website with real-time vibrations being recorded from Australian stations.

We tend to forget that even though we rarely feel any shaking in Ballarat, in fact mini-movements are happening all the time as the earth's crust constantly adjusts itself.

Carol Hall.

New committee members, please

The committee is urgently looking for members who are willing to join the group and share their interests and talents to support the work of FNCB. (Committee meetings are fun! Ask its members. It has been short of two members for the past year.)

Nomination forms are now available at the meeting or from the secretary. Please consider nominating.

Mt Warrenheip and Lake Esmond Excursion

On the Sunday at the time designated to make the decision to go ahead with the excursion the weather was fine. Earlier notices had forecasted very heavy storms during the weekend. During the day, about 16 club members braved some short, but heavy showers.

At the entrance to the road up Mt Warrenheip we did some car pooling and proceeded up the road a short distance to a site, where the structure of the volcanic cone with its breached crater, was best viewed.

This crater of the mountain was not burnt in the fire in 2013. That fire was started by lightning in a paddock adjacent to the north east corner of the mountain reserve. It quickly spread into the reserve and burnt much of the northern part of the mountain before the brigades, with help of a thunderstorm, brought it under control.

The next site we stopped at was on the northeast corner where there was a clear view of the countryside of Leigh Creek, Bungaree and Clarkes Hill. Just before we reached the summit we stopped to look at a fern that differed from the abundant Bracken Fern. Les had

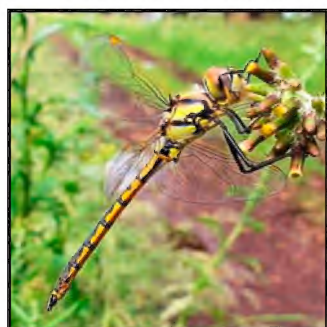


Photo: Tau Emerald Dragonfly, *Hemicordulia tau*.

identified it as Mother Shield Fern. (See post script re further investigation.)

For the other plants that were observed close-up, see the plant list opposite.

When we reached the summit and parked the cars, we took a walk along a track beside the tower building to a place where there was thick regrowth due to a hot burn during the fire. The young trees included Messmate *Eucalyptus obliqua*, Manna Gum *Eucalyptus viminalis*. In the surrounding areas there was an abundance of Elder Berry in flower.

Before we left the summit keen eyes saw a Koala high in a tree near the parking area - much to everyone's delight. Others were entranced by a dragon fly which was photographed by a few. (See photo in which, sadly, the wings are not visible unless magnified.)

Before we left the base of mountain we noticed a few more plants including Sweet Bursaria *Bursaria spinosa*.

Next we made tracks for Lake Esmond off Lal Lal St in Ballarat East. We travelled a road into Ballarat that was new to some members - SEC road. It was noted that on this road there was a special roadside reserve which we plan to visit another time.

On our walk around Lake Esmond we saw a number of birds including Bronze-wing Pigeon, White-eyed Ducks, Reed Warblers, Black Duck and some strangely-coloured crossbreds.

Before the picnic tea we shared at the end of the day, we were joined by a few other club members.

Fran Hanrahan

Mt Warrenheip excursion plant list compiled by J Gregurke

Scientific name	Common name
<i>Acacia melanoxylon</i>	Blackwood
<i>Cassinia aculeata</i>	Common Cassinia
* <i>Cirsium vulgare</i>	*Spear thistle
* <i>Conium maculatum</i>	Hemlock
* <i>Dactylis glomeratus</i>	Cocksfoot
<i>Eucalyptus obliqua</i>	Messmate
<i>Eucalyptus viminalis ssp viminalis</i>	Manna gum
* <i>Myosotis arvensis</i>	Common Forget-me-not
<i>Poa labillardieri</i>	Tussock grass
<i>Polystichum proliferum</i>	Mother Shield-fern
<i>Pteridium esculentum</i>	Austral Bracken
* <i>Silybum marianum</i>	Variegated thistle
<i>Solanum laciniatum</i>	Large Kangaroo-apple
<i>Veronica derwentia</i>	Derwent Speedwell

* denotes naturalised weeds.

Postscript: Mother Shield Fern *Polystichum proliferum*

John Petheram: I thought you'd be interested in this confirmation (through Parks Vic and Vic Herbarium) that the fern we looked at on Mt Warrenheip is ***Polystichum proliferum*** - the name Les gave me several months ago. I had shown the historian Peter Hiscock (from Buninyong) the fern six months ago and he subsequently took the fern to a botanist from DELWP to see the plant and to confirm its ID. Peter was also interested in whether this fern was related to the name of the mountain, as the name Warrenheip is said to mean 'fern-like vegetation', or 'looking like an emu feather' among local Aboriginal people.

Prof Ian Clark at Fed Uni says he does not think the name has any link to the fern itself. (Anyway - there is much more bracken on the mountain than *Polystichum proliferum*.)

I was amazed to see in the note below from Val Stajsic of Delwp that the only previous collection of *Polystichum proliferum* at the Herbarium was collected in 1880.

To Donna McMaster, delwp:

We do not hold any specimens from Mt Warrenheip, nor from Mt Buninyong, where I'd imagine it might be present on a shaded slope or in moist gully. I thought there might be specimens from near Daylesford where there is ample suitable habitat, but we hold only a single collection from 1880. I can't recall if I've seen it around Ballarat or not. An inspection of some moist forest between Ballarat and Daylesford might turn-up further populations, wouldn't surprise me. FYI see the AVH website for distributional information.

Can you please provide me with the original full-size electronic images, which I'll attach to the record in our database when the specimen is databased. I've waived the fee. Regards, Val
(Val Stajsic, rbg)

Extracts from Meeting Minutes Dec. 1, 2017

Opening and Apologies

Attend.: President John Gregurke welcomed 23 members including David Horwood attending his first meeting, new member Bernadette Cheesman and soon-to-be member Catherine Hills. **Apol.** Shirley Faull, Mark Moravec, Bill and Kathy Elder, Bill Murphy, Paul and Elspeth Norquay, John Morrish, Margaret Rich, Peter Noble, Margaret Thomas and Peter Billing.

Correspondence: IN Nov. 3,

From Donna McMaster, DELWP: link to new Museum Victoria frog identification app.

From Peter Reid, BREAZE: offers of possible small donation (\$200) for revegetation or direct seeding project at Woowookarung and use of free Community site at Ballarat Farmer's Market.

From Kevin Sparrow, FJC Rogers Seminar 2016: notification of the 2018 FJC Rogers Seminar focusing on Goodeniaceae on October 20-21, and details of new event secretary if FNCB wishes to receive ongoing updates about the event.

Reports: Treasurer's Report: Opening bal: \$7,978.40 Income \$0
Expenses \$73.30 closing bal: \$7,905.10

Biodiversity Response Planning: Emily reported on the five Biodiversity Response Planning Co-design workshops organised by DELWP that she and Pete have attended in Melbourne over the last 5 weeks along with 100 others, planning the process by which the new State Gov't biodiversity plan "Protecting Victoria's Environment: Biodiversity 2037" will be rolled out across the State and prioritise

expenditure of the State Government's promised funding of \$87 million over the next 4 years.

Club camp at Casterton: Twelve members attended. DELWP's Richard Hill showed them around the area on Saturday. The many highlights were described in the Dec. Club newsletter.

General Business

December field trip and Christmas break-up, from 1.30pm **will be weather dependent given the torrential rains and flooding predicted. Members will be contacted by text message or email by 10.30am Sunday morning.**

Chance to register for Western Treatment Plant field trip (incl. 8.30am departure) on Feb. 4, 2018. Four carloads can attend based on the four permits held by Club members.

Carol volunteered to write up tonight's presentation. Thank you!

Show & Tell/ Field Reports

Carol told us of the New Holland Honeyeaters happily nesting in her Camellia in Wendouree.

Denis reported the unfortunate death of a Shining Bronze-cuckoo that crashed into one of their windows at Beaufort.

John P. remarked on the beautiful display of yellow Common Wedge-peas *Gompholobium huegelii*, orange Parrot-peas *Dillwynia sp.* and Shaggy Peas *Podolobium procumbens*, and purple Chocolate Lilies *Arthropodium strictum* currently flowering in at Woowookarung RP and Creswick forest at the moment.

Emily proudly reported that the Australasian Grebes on her wetland in Scarsdale had four chicks this week. She also noted that the Large Tongue-orchids *Cryptostylis subulata* have just started flowering at Beacon Hill in Enfield State Park, the Large Sickie Greenhoods *Pterostylis falcata* are flowering in Enfield State Forest along Grubbed Rd and the Hyacinth orchids *Dipodium roseum* and *D. pardalinum* have just begun to flower in the forest too.

John G. reported the exciting news that he and a group of Birdlife Ballarat members saw the first Australian Painted Snipe recorded in the Ballarat region for over 20 years during a bird survey at Lake Goldsmith, flushed from shallow marsh.

Erratum In the December Newsletter the label on the photo on P. 11 should have read Salmon Sun Orchid *Thelmytra rubra*

CALENDAR 2018

February 2018

Fri 2 *Biodiversity in leaf litter*: Max Campbell, Pres. FNCV

Sun 4 **8.30am** *Western Treatment plant*: J Gregurke, Club member
(See P. 2)

Tues 20 Committee meeting at Fran's

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Sat 17	FNCB Display at Farmers' Market at the Lake
Sat 24	<i>Exc.: Ecology of the littoral zone, Torquay: Leon Altoff, FNCV Marine research group (See P.2)</i>
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Committee	
President	John Gregurke
Vice Pres	Fran Hanrahan
Secretary	Emily Noble
Treasurer	Les Hanrahan
Andy Arnold	Val Hocking
Bill Elder	John Mildren

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Meetings are held at the Primary Industries Training Centre, cnr of Gillies and Gregory Sts, on the first Friday of the month at 7.30pm..

Excursions: Leave from the carpark at the Primary Industries Training Centre, cnr Gillies and Gregory Sts. at 9.30 am, unless otherwise advised.

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